HESTIA RUPES (V-22) AND IX CHEL CHASMA (V-34) QUADRANGLES

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V-22 (0°-25° N., 60°-90° E.) and V-34 (0°-25° S., 60°-90° E.) quadrangles comprise the west-central portion of Aphrodite Terra (including Ovda Regio) and the plains to the north and south. The overall purpose of this mapping is to investigate the structures of Aphrodite Terra (tessera and chasma) and document their spatial and temporal relation with adjoining plains.

V-22: Tessera formation is the earliest event. The tessera in this part of Ovda contains several tectonic domains, where central Ovda comprises a disorganized network of primarily extensional features (identified by 1, 2). Toward the plateau margins, this fabric yields to one dominated by margin-parallel folds and margin-normal extensional structures, recording maximum compressional strains perpendicular to the margin. Relatively minor intratessera plains are concentrated in topographic lows and may record extensional deformation.

Two major plains units cover most of the quadrangle: one with low backscatter and wrinkle ridges of variable trend, and a second of low to moderate backscatter that contains numerous structural and small (<tens of kilometers) volcanic features. Several units predate these regional plains. The oldest plains units include areally concentrated episodes of ridge and fracture formation. Ridge belts have a rather consistent northwest trend throughout the quadrangle. Two coronae also predate the regional plains, one (Kaltash) erupted within tessera terrain and has an extensive associated fracture system. Subsequent to the regional plains, two coronae (Kunhild and Ereshkigal) that have extensive radial flows and one large volcano (Uti Hiata) and associated flows were emplaced. Much of the radar contrast in the western part of the quadrangle is subdued by deposits from Mead crater and the crater Adivaar. This area includes topographic lows in the plains marked by radial and concentric compressional structures that may represent lithospheric downwelling or delamination.

V-34: Tessera formation is also the earliest event in this quadrangle. There is more variability of tectonic domains in this region than to the north, and the easternmost part of Ovda contains very high and low reflectivity materials typical of Venus mountaintops. Large (hundreds of kilometers) kipukas of tessera terrain lie within the plains south of Aphrodite proper. The tessera terrain is embayed by a regional plains unit that contains prominent wrinkle ridges trending generally north-northwest. Within these plains is an unusual ~30 km shield volcano with caldera [3]. Both the tessera, intratessera plains, and regional plains units are deformed by the structures of Ix Chel Chasma, which contain numerous fractures, arachnoids, and possibly the Verdandi Corona, which has erupted within tessera terrain. Substantial (hundreds of kilometers long) sinuous rilles emanate from Ix Chel and are associated with braided delta deposits and significant lava flows flowing downhill from the chasma south to the plains. Many of these rilles have large depressions at their heads (Lo Shen Valles). The relation between two coronae (Nishtigri and Aramaiti) and the regional plains remains uncertain at the time of this writing. Areas around craters seem to have an unusually large (relative to the average on the planet) amount of local aeolian deposits. This may be a result of winds associated with the high topography in this region.

Plains-Tessera Margins: The relation between plains and tessera is primarily one of embayment, where the plains postdate tessera structures. However, much of the plains along both the north and south boundaries of Ovda

are tilted and uplifted, where the plains-tessera boundary may lie up to one kilometer above the average regional plains. In the V-22 quadrangle, ridges in the plains adjoining tessera trend subparallel to tessera ridges, suggesting a common stress regime. This relative displacement is attributed to tectonic modification of the plains by several mechanisms we hypothesize here. Post-plains uplift of the tessera plateau may indicate the final stages of plateau formation. Gravitational relaxation of the plateau may concentrate stress outward producing margin-parallel compressional structures. Finally, subsidence of the plains due to cooling of the lithosphere or other mechanism subsequent to plains formation may account for the observed topographic variation.

References: [1] Ivanov and Head, JGR 101, 14861, 1996. [2] Hansen and Willis, Icarus 123, 296, 1996. [3] Guest and Stofan, Icarus 139, 55, 1999.